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TITLE: Using Particle Imaging Velocimetry and Radio Frequency Identification to gain insights into erosion processes

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ABSTRACT BODY: Erosion is a particle-based phenomenon, yet most of current understanding and modelling of this process is based on bulk measurements rather than the movement of individual particles. However, the application of two new technologies allows improved insight into the entrainment, transport and deposition of individual particles and facilitates particle-based modelling of the particle-based process. In this presentation we provide insights into particle movement based upon laboratory experiments using particle imaging velocimetry (PIV) and radio frequency identification (RFID). PIV has been used in experiments in which single raindrops have fallen onto dry sand in order to track the trajectories of detached particles. By measuring the movement of individual particles our aim is to compute the proportion of rainfall energy that is used in particle detachment and transport, and the controls on this proportion. RFID tags embedded into resin to mimic sand-sized particles have been tracked under simulated rainfall applied to bare-soil plots. By covering and uncovering particles at different times during the experiments we have been able to produce distributions of travel distances of particles under conditions of rainfall detachment and transport, overland-flow detachment and transport and combined raindrop detachment and flow transport.

KEYWORDS: [1815] HYDROLOGY / Erosion, [1826] HYDROLOGY / Geomorphology: hillslope, [1895] HYDROLOGY / Instruments and techniques: monitoring.

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